

CLAIMS:

1. Pneumatically actuated disc brake, particularly for utility vehicles, having

a) a single-part or multipart caliper (3) which reaches over a brake disc (1) and can be swivelled or displaced relative to a wheel axle or wheel hub,

b) an application device (5) arranged in the caliper (3) for applying the brake,

c) at least one adjusting device for compensating brake pad wear,

characterized in that

d) the adjusting device has at least one adjusting unit (27) which can be actuated independently of the application device directly by means of compressed air.

2. Disc brake according to Claim 1, characterized in that the caliper is constructed as a fixed caliper and the brake disc (1) is constructed to be axially movable at least in the area of its friction ring or is displaceably arranged on a wheel axle.

3. Disc brake according to Claim 1,

characterized in that the brake disc (1) is constructed to be axially movable only by the path of the working stroke at least in the area of its friction ring or is displaceably arranged on a wheel axle.

4. Disc brake according to Claim 1 or 2, characterized in that at least one, preferably two, of the pneumatically operable adjusting unit(s) (27a-d) is/are arranged on both sides of the brake disc (1).

5. Disc brake according to one of the preceding claims, characterized in that two of the pneumatically operable adjusting units (27) is/are arranged on each side of the brake disc (1).

6. Disc brake according to one of the preceding claims, characterized in that pressure chambers (35) of several of the adjusting units (27) are in an operative connection with one another by means of compressed-air pipes and/or compressed-air passages (37, 40, 42).

7. Disc brake according to one of the preceding claims, characterized in that the application device (5) has an eccentric rotary lever (9) which acts on two traverse-type lateral ends upon one intermediate element (11) respectively, which

intermediate element (11) has a recess (77) on its side facing the brake disc.

8. Disc brake according to one of the preceding claims, characterized in that the intermediate elements (11) are displaceably guided in the caliper (3).

9. Disc brake according to one of the preceding claims, characterized in that the intermediate elements (11) are supported by means of plunger rods (15) on pistons (17) axially movable in the caliper (3).

10. Disc brake according to one of the preceding claims, characterized in that the pistons (17) have one pressure surface (20) respectively at the ends facing away from the rotary lever (1), which pressure surfaces (20) rest in a pressure-piece-type manner on a brake pad holding plate (21).

11. Disc brake according to one of the preceding claims, characterized in that the adjusting units (27) each have one of the pistons (17) and one of the plunger rods (15) which are screwed to one another by way of a non-selflocking thread (19).

12. Disc brake according to one of the preceding claims,

characterized in that the plunger rod (15) and the piston (17) of each adjusting unit are non-rotatable relative to one another during application movements and are rotatable relative to one another during adjusting movements.

13. Disc brake according to one of the preceding claims, characterized in that the pistons (17) are each inserted in a recess (25) in the caliper (3).

14. Disc brake according to one of the preceding claims, characterized in that the pistons (17) have a U-shaped construction, the base side of the U-shaped pistons (17) pointing to the brake disc (1), and each piston (17) having a center attachment (31) toward the interior, which center attachment (31) has a bore (33) provided with an internal thread, into which bore (33) the plunger rod (15) is screwed.

15. Disc brake according to one of the preceding claims, characterized in that, on the side of the pistons (17) facing away from the base of the U, in each case, the pressure chamber (35) is constructed in the caliper (3) or between the intermediate elements (11) and the piston (17).

16. Disc brake according to one of the preceding claims,

characterized in that a compressed-air connection (38) is constructed at the caliper (3).

17. Disc brake according to one of the preceding claims, characterized in that the plunger rod (15) of each adjusting unit (27a-d) is equipped with a ring attachment (39) at its end facing away from the brake disc (1), which ring attachment (39) has a conical surface on the face pointing toward the brake disc (1), which conical surface (41) is supported on a correspondingly developed conical surface (43) of a support bearing ring (45) which is preferably supported on the application side at the intermediate element (11) and, on the reaction side, at the caliper (1).

18. Disc brake according to one of the preceding claims, characterized in that a toothing is constructed between the conical surfaces (41, 43).

19. Disc brake according to one of the preceding claims, characterized in that the ring attachment (39), on its side from the cone (41), is supported on a thrust bearing (47) which, on its side facing away from the ring attachment (39), rests on a cup spring (53) and is axially displaceable to a limited extent.

20. Disc brake according to one of the preceding claims, characterized in that, on its side facing away from the disc (49), the cup spring (53) is supported on a retaining ring (55), which engages in a surrounding groove (57) in the caliper (1) or in the intermediate element (11).

21. Disc brake according to one of the preceding claims, characterized in that a second pressure chamber (61) for releasing the toothing between the conical surfaces for restoring the pistons during the brake pad change is assigned to each adjusting unit (27a-d).

22. Disc brake according to one of the preceding claims, characterized in that a metal membrane (59) is arranged axially behind the axial ends of the plunger rods (15) facing away from the brake disc, in the area behind the support bearing rings, which metal membrane (59) bounds the second pressure chamber (61).

23. Disc brake according to one of the preceding claims, characterized in that a compressed-air feed pipe (63) in the caliper (3) leads into the second pressure chamber (61) in the caliper (3), which compressed-air feed pipe (63) is connected with another compressed-air connection on the exterior side of

the caliper (3).

24. Disc brake according to one of the preceding claims, characterized in that, between the metal membrane (59) and the plunger rod (15) a ball (69) is arranged which engages in a centric recess (65) on the face of the plunger rod (15) and into a centric recess (67) of the metal membrane (59).

25. Disc brake according to one of the preceding claims, characterized in that adjusting units (27a-d) have an identical construction with the exception of the pressure rollers (14) and intermediate pieces (11) on the application side and the reaction side of the disc brake.

26. Disc brake according to one of the preceding claims, characterized in that a set of roller bellows (73) is arranged between the ends of each intermediate piece (11) facing the brake disc and the caliper wall in each case accommodating the intermediate piece.

27. Disc brake according to one of the preceding claims, characterized in that each bore (33) in the pistons (17) is closed by means of a sealing washer (75) on the side facing the brake pads.

28. Disc brake according to one of the preceding claims, characterized in that an antirotation protection for the pistons (17) is provided by corresponding devices for an antirotation protection between the brake pad holding plates (21) of the brake pads (23, 24) and the pistons (17).

29. Disc brake according to one of the preceding claims, characterized in that a roller-bellows-type or expansion-bellows-type cap (79) is provided the gap between the circumference of the pistons (17) and the caliper (3) at the end areas of the pistons (17) facing the brake disc (1).

30. Disc brake according to one of the preceding claims, characterized in that, in the gap between the circumference of the pistons (17) and the caliper (3), in each case, a surrounding sealing ring 81 is provided for sealing-off the pressure chamber (35).